

SAGLE VALLEY WATER AND SEWER DISTRICT (PWSNO 1090118) SOURCE WATER ASSESSMENT REPORT

April 23, 2002



State of Idaho Department of Environmental Quality

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Executive Summary

Under the Safe Drinking Water Act Amendments of 1996, all states are required by the U.S. Environmental Protection Agency to assess every source of public drinking water for its relative sensitivity to contaminants regulated by the act. This risk assessment is based on a land use inventory in the well recharge zone, sensitivity factors associated with how the well was constructed, and aquifer characteristics.

This report, *Source Water Assessment for Sagle Valley Water and Sewer District*, describes the public drinking water wells; the well recharge zone and potential contaminant sites located inside the recharge zone boundaries. This assessment, taken into account with local knowledge and concerns, should be used as a planning tool to develop and implement appropriate protection measures for this public water system. **The results should not be used as an absolute measure of risk and they should not be used to undermine public confidence in the water system.**

Sagle Valley Water and Sewer District drinking water is supplied by a single well drawing from a small aquifer in the vicinity of Sagle, Idaho. The system currently serves 27 households located west of Highway 95 just south of Gun Club Road. Historically, Sagle Valley Water and Sewer District has had few water quality problems other than those related to corrosivity. The water is aggressive enough to leach copper out of domestic plumbing in concentrations exceeding the action level. A groundwater Susceptibility Analysis conducted by DEQ April 3, 2002 found the wells to be moderately susceptible to contamination, mostly because of natural risk factors associated with local geology.

This assessment should be used as a basis for determining appropriate new protection measures or re-evaluating existing protection efforts. No matter what ranking a source receives, protection is always important. Whether the source is currently located in a “pristine” area or an area with numerous industrial and/or agricultural land uses that require education and surveillance, the way to ensure good water quality in the future is to act now to protect valuable water supply resources.

The water system is well run, and with the exception of some minor deficiencies noted in the January 2002 sanitary survey, is in compliance with *Idaho Rules for Public Drinking Water Systems*. The district commissioned an engineering study in 1999 in order to develop some alternatives for upgrading the water distribution system serving their subdivision and for providing a second well.

Instituting bylaws to control cross connections, as recommended in the January 2002 sanitary survey, is one of the most important drinking water protection measures the district should take. The district owns the land around its well and restricts activity that could potentially contaminate it. Voluntary protection measures the district should consider are covering the wellhead and fencing the well lot. In addition to providing a barrier to keep animals and vehicles away from the well, a fence is a constant reminder that the well lot should be kept free from the use or storage of potential contaminants like lawn maintenance or dust abatement chemicals. Because the district may not have direct jurisdiction over the entire recharge zone delineated for its wells, it will be important to form partnerships with neighboring landowners, businesses and state and local agencies to protect the ground water in the Sagle aquifer.

Due to the time involved with the movement of ground water, source water protection activities should be aimed at long-term management strategies even though these strategies may not yield results in the near term. For assistance in developing protection strategies, please contact the Coeur d'Alene Regional office of the Department of Environmental Quality or the Idaho Rural Water Association.

SOURCE WATER ASSESSMENT FOR SAGLE VALLEY WATER AND SEWER DISTRICT

Section 1. Introduction - Basis for Assessment

The following sections contain information necessary for understanding how and why this assessment was conducted. **It is important to review this information to understand what the ranking of this source means.** A map showing the delineated source water assessment area and an inventory of significant potential sources of contamination identified within that area are included. The ground water susceptibility analysis worksheets used to develop this assessment are attached.

Level of Accuracy and Purpose of the Assessment

The Idaho Department of Environmental Quality (DEQ) is required by the U.S. Environmental Protection Agency (EPA) to assess every public drinking water source in Idaho for its relative susceptibility to contaminants regulated by the Safe Drinking Water Act. These assessments are based on a land use inventory inside the delineated recharge zones, sensitivity factors associated with how the well is constructed, and aquifer characteristics. The state must complete more than 2900 assessments by May of 2003. Because resources and the time available to accomplish assessments are limited, an in-depth, site-specific investigation for every public water system is not possible.

The results of the source water assessment should not be used as an absolute measure of risk and they should not be used to undermine public confidence in the water system. The ultimate goal of this assessment is to provide data to local communities for developing a protection strategy for their drinking water supply. The Idaho Department of Environmental Quality recognizes that pollution prevention activities generally require less time and money to implement than treating a public water supply system once it has been contaminated. DEQ encourages communities to balance resource protection with economic growth and development. The decision as to the amount and types of information necessary to develop a source water protection program should be determined by the local community based on its own needs and limitations. Wellhead or source water protection is one facet of a comprehensive growth plan, and it can complement ongoing local planning efforts.

The map displays the Sagle Valley area in Idaho, featuring topographic contours, roads, and water bodies. A callout box identifies the 'Sagle Valley W & S District Well' location. An inset map shows the location within the State of Idaho. A scale bar indicates distances up to 4 miles.

Section 2. Preparing for the Assessment

Defining the Zones of Contribution - Delineation

The delineation process establishes the physical area around a well that will become the focal point of the assessment. The process includes mapping the boundaries of the well recharge area into time of travel zones indicating the number of years necessary for a particle of water to reach a well. DEQ used a refined computer model approved by the EPA to determine the time of travel (TOT) for water the Sagle Valley Water and Sewer District well pumps from the Sagle aquifer. The computer model used data assimilated by DEQ from a variety of sources including local well logs and the report *Steady State Simulation of Nutrient and Contaminant Transport in the Southside Aquifer Near Sagle, Idaho* prepared by J-U-B Engineers, Inc. for Southside Water and Sewer District.

The Sagle Valley Water and Sewer District community water system serves a population of about 80 people in Sagle Valley Estates development (Figure 1). A 225-foot deep capable of drawing about 70 GPM from the Sagle Aquifer supplies water for the district's customers.

The well recharge zone delineated for the Sagle Valley Water and Sewer District well covers only 4.9 acres divided into 0-3, 3-6 and 6-10-year time of travel zones. the recharge zone is about 950 feet long and 250 feet wide The primary direction of ground water flow is from southwest to northeast (Figure 2).

Identifying Potential Sources of Contamination

The goal of the inventory process is to locate and describe those facilities, land uses, and environmental conditions that are potential sources of ground water contamination. Inventories for public water systems in Idaho were conducted in two-phases. The first phase involved identifying and documenting potential contaminant sources inside individual source water assessment areas through the use of computer databases and Geographic Information System maps developed by DEQ. The maps and inventory lists were then sent to system operators for verification and correction in the second or enhanced part of the inventory process.

Figure 2, *Sagle Valley Water and Sewer District Delineation and Potential Contaminant Inventory* on page 7 of this report shows the location of the Sagle Valley Water and Sewer District well, the zone of contribution DEQ delineated for the well, and potential contaminant sites located in the vicinity. Land use inside the delineation boundaries is mostly residential.

Many potential sources of contamination are regulated at the federal level, state level, or both to reduce the risk of release. When a business, facility, or property is identified as a potential contaminant source, this should not be interpreted to mean that this business, facility, or property is in violation of any local, state, or federal environmental law or regulation. What it does mean is that the potential for contamination exists due to the nature of the business, industry, or operation.

Section 3. Susceptibility Analysis

The susceptibility to contamination of all groundwater sources in Idaho is being assessed on the following factors:

- physical integrity of the well,
- hydrologic characteristics,
- land use characteristics, and potentially significant contaminant sources
- historic water quality

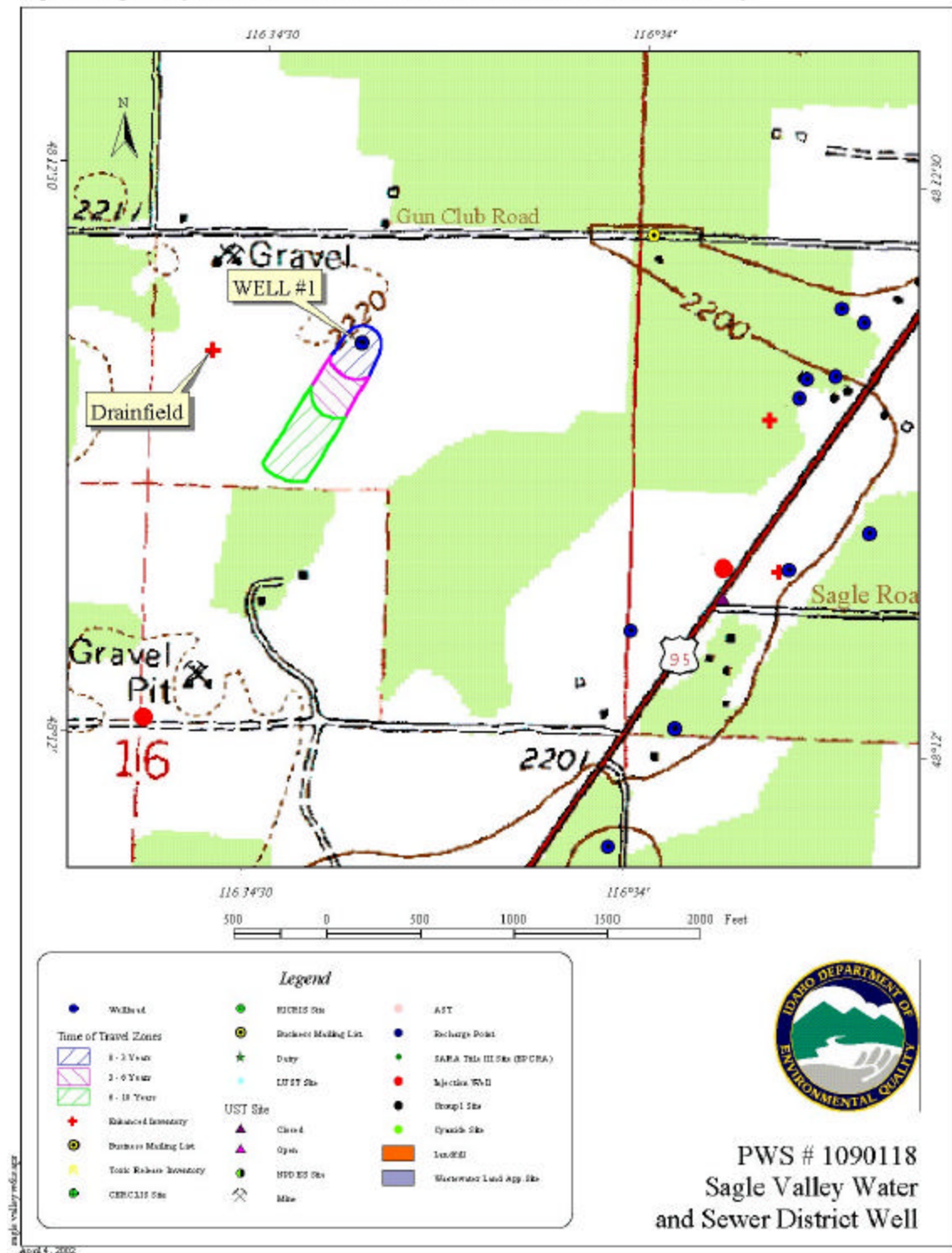
The susceptibility rankings are specific to a particular potential contaminant or category of contaminants. A high susceptibility rating relative to one potential contaminant does not mean that the water system is at the same risk for all other potential contaminants. The relative ranking that is derived for each well is a qualitative, screening-level step that, in many cases, uses generalized assumptions and best professional judgement. The following summaries describe the rationale for the susceptibility ranking. The Susceptibility Analysis Worksheet in Attachment A shows in detail how the Sagle Valley Water and Sewer District well scored.

Well Construction

Construction methods directly affect the ability of a well to protect the aquifer from contaminants. Lower scores imply a well that can better protect the water. This portion of the susceptibility analysis relies on information from individual well logs and from the most recent sanitary survey of the public water system. The well log for Sagle Valley Water and Sewer District was found in a search of Idaho Department of Water Resources (IDWR) records. A sanitary survey of the system was conducted in January 2002.

The Sagle Valley Water and Sewer District well was drilled in May 1980 to a depth of 225 feet. The 8-inch steel casing extends from 2 feet above ground to a depth of 216 feet, terminating in a water-bearing stratum composed of sand and gravel. A stainless steel well screen is set from 215 to 225 feet. The static water level is 82 feet below ground. The well overbore was sealed with puddling clay and well cuttings to a depth of 18 feet. Current IDWR regulations require a 20-foot minimum seal depth for public drinking water wells in unconsolidated formations.

Figure 2. Sagle Valley Water and Sewer District Delineation and Potential Contaminant Inventory.



Hydrologic Sensitivity

The hydrologic sensitivity score for the Sagle Valley Water and Sewer District well is 6 points out of 6 points possible. This score reflects natural geologic conditions in the recharge zone as a whole and at the well site. Soils in the capture zone delineated for the well are generally moderately well drained to well drained. Poorly drained to moderately well drained soils are deemed more protective of ground water than soils which drain faster. The depth to first ground water in the well is only 75 feet, with a more productive stratum between 195 and 225 feet. The soil column above a deeper water table provides some protection from potential contaminants through adsorption and other mechanisms.

The well log documents permeable sand and silt and sand and gravel soils above the water table. There is no distinct stratum of fine-grained material to retard the vertical transport of contaminants.

Potential Contaminant Sources and Land Use

Land use inside the Sagle Valley Water and Sewer District well recharge zone is mostly residential. Homes in the area have individual septic systems. The community drainfield located about 1000 feet west 450 feet south of the well was abandoned. It is outside of the delineation boundary, but its approximate location is noted because of the uncertainty inherent in ground water modeling. No potential contaminant sites are documented inside the delineation. For the purposes of this analysis, individual septic systems are not considered a significant threat to ground water quality until their density exceeds 10 in 40 acres.

Table 1. Sagle Valley Water and Sewer District Potential Contaminant Inventory

SITE DESCRIPTION	POTENTIAL CONTAMINANTS ¹	TIME OF TRAVEL ZONE	SOURCE OF INFORMATION
Community Drainfield	IOC, Microbial	Outside of Delineation Boundaries	Public Water System Files

¹ IOC = inorganic chemical, VOC = volatile organic chemical, SOC = synthetic organic chemical

Historic Water Quality

Historically, Sagle Valley Water and Sewer District has had few water quality problems other those related to corrosivity of the water. The water is aggressive enough to leach copper from domestic plumbing at concentrations exceeding the action level. The district is gathering information about the best way to remedy the problem with a deadline of December 2002 for installation of a corrosion control system.

The system collects one routine sample monthly for bacterial testing. No positive samples have been confirmed in follow up testing. The system does not need to disinfect its water. Chemical and radiological test results for the district are summarized on the table below.

Table 2. Sagle Valley Water and Sewer District Test Results

Primary IOC Contaminants (Mandatory Tests)							
Contaminant	MCL (mg/l)	Results (mg/l)	Dates	Contaminant	MCL (mg/l)	Results (mg/l)	Dates
Antimony	0.006	ND	12/6/80 to 4/3/94	Nitrate	10	0.48 to 0.7	12/16/80 to 5/1/01
Arsenic	0.01	ND	12/6/80 to 5/1/01	Nickel	N/A	ND	12/6/80 to 4/3/94
Barium	2.0	ND	12/6/80 to 4/3/94	Selenium	0.05	ND	12/6/80 to 4/3/94
Beryllium	0.004	ND	12/6/80 to 4/3/94	Sodium	N/A	4.3, 4.9	5/1/01, 2/11/97
Cadmium	0.005	ND	12/6/80 to 4/3/94	Thallium	0.002	ND	12/6/80 to 4/3/94
Chromium	0.1	ND	12/6/80 to 4/3/94	Cyanide	0.02	ND	12/6/80 to 4/3/94
Mercury	0.002	ND	12/6/80 to 4/3/94	Fluoride	4.0	0.18	12/16/80
Secondary and Other IOC Contaminants (Optional Tests)							
Contaminant	Recommended Maximum (mg/l)		Results (mg/l)			Dates	
Alkalinity			52.2			4/3/94	
Calcium			13.8			4/3/94	
Iron			0.02			1/13/98	
Lead	0.015		0.01			12/16/80	
Sulfate			5.6, 5.64			2/11/97, 4/3/94	
Regulated and Unregulated Synthetic Organic Chemicals							
Contaminant				Results		Dates	
29 Regulated and 13 Unregulated Synthetic Organic Compounds				None Detected		1/30/96, 9/6/01	
Regulated and Unregulated Volatile Organic Chemicals							
Contaminant				Results		Dates	
21 Regulated And 16 Unregulated Volatile Organic Compounds				None Detected		7/29/92, 1/30/96	
Radiological Contaminants							
Contaminant			MCL	Results	Dates		
Gross Alpha, Including Ra & U			15 pC/l	0.4 pC/l	2/11/97		
Gross Beta Particle Activity			4 mrem/year	0.8 mrem	2/11/97		

Final Susceptibility Ranking

The Sagle Valley Water and Sewer District well ranked moderately susceptible to all classes of regulated contaminants. Risk factors associated with local geology added the most points to the final susceptibility scores. Final scores and ranking relative to each class of contaminant are summarized on Table 3. The complete analysis worksheet for the well is in Attachment A.

The final scores for the susceptibility analysis were determined using the following formulas:

- 1) VOC/SOC/IOC Final Score = Hydrologic Sensitivity + System Construction + (Potential Contaminant/Land Use x 0.2)
- 2) Microbial Final Score = Hydrologic Sensitivity + System Construction + (Potential Contaminant/Land Use x 0.375)

The final ranking categories are as follows:

- 0 - 5 Low Susceptibility
- 6 - 12 Moderate Susceptibility
- > 13 High Susceptibility

Table 3. Summary of Sagle Valley Water and Sewer District Susceptibility Evaluation

Final Susceptibility Scores/ Ranking				
	IOC	VOC	SOC	Microbial
Well #1	10/Moderate	10/Moderate	10/Moderate	10/Moderate

IOC = inorganic chemical, VOC = volatile organic chemical, SOC = synthetic organic chemical

HIGH* - Indicates source automatically scored as high susceptibility due to presence of bacteria or a VOC, SOC or an IOC above the maximum contaminant level in the tested drinking water

Section 4. Options for Source Water Protection

The susceptibility assessment should be used as a basis for determining appropriate new protection measures or re-evaluating existing protection efforts. No matter what the susceptibility ranking a source receives, protection is always important. Whether the source is currently located in a “pristine” area or an area with numerous industrial and/or agricultural land uses that require education and surveillance, the way to ensure good water quality in the future is to act now to protect valuable water supply resources.

Except for minor deficiencies noted in the January 2002 sanitary survey, Sagle Valley Water and Sewer District operates and maintains its water system in compliance with *Idaho Rules for Public Drinking Water Systems*.

The district needs to adopt and enforce cross connection control regulations. Back siphonage during periods of low pressure can introduce surface contaminants into the distribution system or the well itself. The district owns the land around its wells and restricts activity that could potentially contaminate it. Additional protection measures the district should consider are voluntary and include covering the wellhead and fencing the well lot. Besides providing a barrier to keep animals and vehicles away from the wells, a fence is a constant reminder that the well lot should be kept free from the use or storage of potential contaminants like lawn maintenance or dust abatement chemicals.

When the time comes to choose a new well site, the district should have the capture zones for alternative sites modeled. Depending on the direction of ground water flow, a proposed community drainfield that meets current set back regulations could still fall inside the 0-3 year time of travel zone for the well, increasing the risk for inorganic chemical contamination or contamination with viruses. The model for the Sagle aquifer developed by DEQ for source water assessments could be utilized for this purpose.

Because part of the delineated capture zone for the well may be outside the direct jurisdiction of Sagle Valley Water and Sewer District, working with the Bonner County Planning and Zoning board and other public drinking water systems drawing from the Sagle Aquifer to establish a wellhead protection overlay zone is probably the most effective way to prevent contamination due to land use changes in the area.

In its own service area and in the capture zone for the wells, the system should promote ground water stewardship programs. Home*A*Syst and Farm*A*Syst for example are voluntary programs that help people assess environmental risks on their property and find technical support for making needed changes. The Internet has dozens of sites devoted to ground water stewardship programs that are tailored various age groups. 4H clubs in the area may be interested in undertaking water protection activities as a service project. The County Extension office is a resource for workshops devoted to topics like septic tank maintenance and household use of pesticide, herbicides and fertilizer that would be useful in a rural neighborhood.

Partnerships with state and local agencies, any businesses in the capture zone and neighboring landowners should also be established. Some of them may not be aware that their property is in a sensitive area where household, agricultural or business practices could have a negative impact on water quality for the whole community. Due to the time involved with the movement of ground water, drinking water protection activities should be aimed at long-term management strategies even though these strategies may not yield results in the near term.

Assistance

Public water suppliers and users may call the following IDEQ offices with questions about this assessment and to request assistance with developing and implementing a local protection plan. In addition, draft protection plans may be submitted to the IDEQ office for preliminary review and comments.

Coeur d'Alene Regional DEQ Office (208) 769-1422

State IDEQ Office (208) 373-0502

Website: <http://www.deq.state.id.us>

Water suppliers serving fewer than 10,000 persons may contact Melinda Harper, Idaho Rural Water Association, at (208) 343-7001 for assistance with drinking water (formerly wellhead protection) strategies.

References Cited

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Natural Resource Conservation Service, 1991. Idaho Snake-Payette Rivers Hydrologic Unit Plan of Work. March 1991.

United States Geological Survey, 1986. Quality of Ground Water in the Payette River Basin, Idaho. United States Geological Survey. Water Resources Investigation Report 86-4013.

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Attachment A

Sagle Valley Water and Sewer District Susceptibility Analysis Worksheet

Ground Water Susceptibility

Public Water System Name : **SAGLE VALLEY WATER AND SEWER DIST** Source: **WELL #1**
 Public Water System Number : **1090118** 4/3/02 1:33:58 PM

1. System Construction		SCORE			
Drill Date	5/30/80				
Driller Log Available	YES				
Sanitary Survey (if yes, indicate date of last survey)	YES 2002				
Well meets IDWR construction standards	NO	1			
Wellhead and surface seal maintained	YES	0			
Casing and annular seal extend to low permeability unit	NO	2			
Highest production 100 feet below static water level	YES	0			
Well located outside the 100 year flood plain	NO	1			
Total System Construction Score		4			
2. Hydrologic Sensitivity					
Soils are poorly to moderately drained	NO	2			
Vadose zone composed of gravel, fractured rock or unknown	YES	1			
Depth to first water > 300 feet	NO	1			
Aquitard present with > 50 feet cumulative thickness	NO	2			
Total Hydrologic Score		6			
3. Potential Contaminant / Land Use - ZONE 1A (Sanitary Setback)		IOC Score	VOC Score	SOC Score	Microbial Score
Land Use Zone 1A	RESIDENTIAL	1	1	1	1
Farm chemical use high	NO	0	0	0	
IOC, VOC, SOC, or Microbial sources in Zone 1A	NO	NO	NO	NO	NO
Total Potential Contaminant Source/Land Use Score - Zone 1A		1	1	1	1
Potential Contaminant / Land Use - ZONE 1B (3 YR. TOT)					
Contaminant sources present (Number of Sources)	NO	0	0	0	0
(Score = # Sources X 2) 8 Points Maximum		0	0	0	0
Sources of Class II or III leacheable contaminants or Microbials	NO	0	0	0	
4 Points Maximum		0	0	0	
Zone 1B contains or intercepts a Group 1 Area	NO	0	0	0	0
Land use Zone 1B	Less Than 25% Agricultural Land	0	0	0	0
Total Potential Contaminant Source / Land Use Score - Zone 1B		0	0	0	0
Potential Contaminant / Land Use - ZONE II (6 YR. TOT)					
Contaminant Sources Present	NO	0	0	0	
Sources of Class II or III leacheable contaminants or Microbials	NO	0	0	0	
Land Use Zone II	Less than 25% Agricultural Land	0	0	0	
Potential Contaminant Source / Land Use Score - Zone II		0	0	0	0
Potential Contaminant / Land Use - ZONE III (10 YR. TOT)					
Contaminant Source Present	NO	0	0	0	
Sources of Class II or III leacheable contaminants or Microbials	NO	0	0	0	
Is there irrigated agricultural lands that occupy > 50% of Zone	NO	0	0	0	
Total Potential Contaminant Source / Land Use Score - Zone III		0	0	0	0
Cumulative Potential Contaminant / Land Use Score		1	1	1	1
4. Final Susceptibility Source Score		10	10	10	10
5. Final Well Ranking		Moderate	Moderate	Moderate	Moderate

POTENTIAL CONTAMINANT INVENTORY

LIST OF ACRONYMS AND DEFINITIONS

AST (Aboveground Storage Tanks) – Sites with aboveground storage tanks.

BML (Business Mailing List)– This list contains potential contaminant sites identified through a yellow pages database search of standard industry codes (SIC).

CERCLIS – This includes sites considered for listing under the **Comprehensive Environmental Response Compensation and Liability Act (CERCLA)**. CERCLA, more commonly known as Superfund is designed to clean up hazardous waste sites that are on the national priority list (NPL).

Cyanide Site – DEQ permitted and known historical sites/facilities using cyanide.

Dairy – Sites included in the primary contaminant source inventory represent those facilities regulated by Idaho State Department of Agriculture (ISDA) and may range from a few head to several thousand head of milking cows.

Deep Injection Well – Injection wells regulated under the Idaho Department of Water Resources generally for the disposal of stormwater runoff or agricultural field drainage.

Enhanced Inventory – Enhanced inventory locations are potential contaminant source sites added by the water system. These can include new sites not captured during the primary contaminant inventory, or corrected locations for sites not properly located during the primary contaminant inventory. Enhanced inventory sites can also include miscellaneous sites added by the Idaho Department of Environmental Quality (DEQ) during the primary contaminant inventory.

Floodplain – This is a coverage of the 100year floodplains.

Group 1 Sites – These are sites that show elevated levels of contaminants and are not within the priority one areas.

Inorganic Priority Area – Priority one areas where greater than 25% of the wells/springs show constituents higher than primary standards or other health standards.

Landfill – Areas of open and closed municipal and non-municipal landfills.

LUST (Leaking Underground Storage Tank) – Potential contaminant source sites associated with leaking underground storage tanks as regulated under RCRA.

Mines and Quarries – Mines and quarries permitted through the Idaho Department of Lands.)

Nitrate Priority Area – Area where greater than 25% of wells/springs show nitrate values above 5mg/l.

NPDES (National Pollutant Discharge Elimination System)

– Sites with NPDES permits. The Clean Water Act requires that any discharge of a pollutant to waters of the United States from a point source must be authorized by an NPDES permit.

Organic Priority Areas – These are any areas where greater than 25 % of wells/springs show levels greater than 1% of the primary standard or other health standards.

Recharge Point – This includes active, proposed, and possible recharge sites on the Snake River Plain.

RICRIS – Site regulated under **Resource Conservation Recovery Act (RCRA)**. RCRA is commonly associated with the cradle to grave management approach for generation, storage, and disposal of hazardous wastes.

SARA Tier II (Superfund Amendments and Reauthorization Act Tier II Facilities) – These sites store certain types and amounts of hazardous materials and must be identified under the Community Right to Know Act.

Toxic Release Inventory (TRI) – The toxic release inventory list was developed as part of the Emergency Planning and Community Right to Know (Community Right to Know) Act passed in 1986. The Community Right to Know Act requires the reporting of any release of a chemical found on the TRI list.

Closed Or Open UST (Underground Storage Tank) – Potential contaminant source sites associated with underground storage tanks regulated as regulated under RCRA.

Wastewater Land Applications Sites – These are areas where the land application of municipal or industrial wastewater is permitted by DEQ.

Wellheads – These are drinking water well locations regulated under the Safe Drinking Water Act. They are not treated as potential contaminant sources.

NOTE: Many of the potential contaminant sources were located using a geocoding program where mailing addresses are used to locate a facility. Field verification of potential contaminant sources is an important element of an enhanced inventory.

Where possible, a list of potential contaminant sites unable to be located with geocoding will be provided to water systems to determine if the potential contaminant sources are located within the source water assessment area.